DESCRIPTION

SLIDE FASTENER

Technical Field

The present invention relates to a slide fastener having electromagnetic wave shield performance capable of shielding interfering electromagnetic waves or fire-resistant performance of low flammability.

Background Art

In recent years, slide fasteners having special performance such as electromagnetic wave shield performance and fire-resistant performance have been required to be provided at a low cost without the degradation of quality as well as to effectively exhibit the special performance.

For example, as a conventional electromagnetic wave shield slide fastener, an electromagnetic wave shield slide fastener 99 which is fabricated through the steps of: forming a wire-mesh 97 weft-knitted with thin wires into a bag shape as an electromagnetic wave shield member 98; inserting a core material having a core string part 96 formed at an edge part thereof into the bag-shaped part of the electromagnetic wave shield member 98 to form a fastener tape 95; and then fixing fastener elements 94 made of metal to the core string part 96, as shown in Fig. 8, is known (refer to the microfilms of Japanese Utility Model Application No. 57-60773, (Japanese Utility Model Laid-Open No. 58-164290)).

In the case of the aforementioned electromagnetic wave shield slide fastener given in Fig. 8, the electromagnetic wave shield member as a component of the fastener tape has a special configuration and resultantly a special manufacturing apparatus is required in order to secure the electromagnetic wave shield performance. Therefore, it is difficult to provide a low cost electromagnetic wave shield slide fastener or an electromagnetic wave shield slide fastener having good flexibility and high quality.

Disclosure of the Invention

An object of the present invention is, in the event of providing a slide fastener having special performance such as electromagnetic wave shield performance and fire-resistant performance, to provide a slide fastener having good appearance and good quality at a low cost by using a fastener tape not requiring a special structure without using a fastener tape specially produced for the slide fastener as a component of the slide fastener, and thus cutting the product cost.

Other objects of the present invention are as follows:

To provide a slide fastener that allows a curved fastener tape to be easily fabricated with an extremely simple structure and does not cause sewing wrinkles for the fastener tape when the fastener tape is sewed on a joining material;

To provide a slide fastener that allows fastener elements to be attached to a folded part formed by folding a fastener tape double with a simple structure and stable configuration;

To provide a slide fastener that facilitates firm attachment of fastener elements by reinforcing the folded part formed by folding a fastener tape double;

To provide a slide fastener that facilitates firm attachment of single-piece fastener elements, in particular, by reinforcing the folded part formed by folding a fastener tape double and the peripheral area thereof;

To provide a slide fastener that allows the product to be supplied at a low cost by specifying the configuration of a fastener tape so that the fastener tape can have special performance easily; and

To provide a slide fastener that allows a fastener tape to easily have electromagnetic wave shield performance or further special performance such as fire-resistant performance.

In order to achieve the above objects, the present invention employs the following configurations.

In a slide fastener according to the present invention, a fastener element 3 is

attached to a first edge part 12 of a fastener tape 2, and the fastener tape 2 in the vicinity of the installation part 5 of the fastener element 3 is sewn with a sewing thread 6 continuously extending in the longitudinal direction of the fastener tape 2.

Here, the part of the fastener tape 2, to which the fastener element 3 is attached may be single-layered or double-layered.

In the configuration, the fastener element is attached to the edge part of the fastener tape and vicinity area of the installation part of the fastener element is sewn with the sewing thread. Accordingly, the fastener tape is tightened in the longitudinal direction thereof and thus the edge part thereof is curved toward the inner side of the tape. Consequently, the configuration has an effect of providing, at a low cost, a high quality slide fastener capable of avoiding the phenomenon of a waved fastener tape, namely sewing wrinkles, resulted from sewing shrinkage caused when a fastener stringer is attached to a joining material by sewing.

In a slide fastener according to the present invention, a folded part 4 is formed by folding a first edge part 12 of a fastener tape 2 inward to overlay the folded parts, a fastener element 3 is attached to the folded part 4 of the overlaid structure, and the fastener tape 2 in the vicinity of the installation part 5 of the fastener element 3 is sewn with a sewing thread 6 continuously extending in the longitudinal direction of the fastener tape 2.

The configuration has an effect of reinforcing the edge part of a fastener tape and assuring the attachment of a fastener element in a stable state by folding the edge part of the fastener tape inward, thus forming the folded part, and attaching the fastener element to the folded part.

In a slide fastener according to the present invention, a core material 8 formed in various shapes is inserted into the folded part 4 formed at a first edge part 12 of a fastener tape 2 to reinforce the folded part 4, a fastener element 3 is attached to the folded part 4 with the core material 8 being interposed, and the fastener tape 2 in the vicinity of the installation part 5 of the fastener element 3 is sewn with a sewing thread 6 continuously

extending in the longitudinal direction of the fastener tape 2.

As the core material 8, it is preferable to use a core material 8 formed with a core string 10 attached to an edge of a support piece 11.

The configuration has an effect of reinforcing the edge part of a fastener tape and assuring the firm installation attachment of a fastener element in a stable state by inserting a core material into the folded part of the fastener tape or into the folded part and the peripheral area thereof, and thus attaching the fastener element with the core material being interposed. By providing a core string to the core material, the reinforcing effect is further enhanced.

In the slide fastener according to the present invention, it is preferable that a fastener element 3 has a fitting head 16 and a pair of legs 15 projecting from the fitting head 16 and the legs 15 are attached in a manner of clamping the folded part 4.

By this configuration, a fastener element can firmly be attached to a fastener tape in a stable state even when the fastener element is made of metal.

The fastener tape 2 of a slide fastener according to the present invention is made of fiber and the whole body of the fastener tape 2 is formed with a uniform structure.

According to the configuration, since a fastener tape is made of fiber and the whole tape is formed with a uniform structure, on applying a plating solution or a coating agent, it uniformly infiltrates into the whole body of the tape and resultantly electromagnetic wave shield treatment by plating and coating treatment with a fire-resistant additive can be applied to the fastener tape extremely easily. A preferable fastener tape is a woven tape having a plain weave structure woven by the warp and the weft, which has an effect of making a high quality product at a low cost.

It is preferable that the slide fastener according to the present invention has electromagnetic wave shield performance by applying metal plating as a special performance mechanism onto the surface of the fastener tape 2.

It is preferable that the slide fastener according to the present invention has also fire-resistant performance by further applying coating of a fire-resistant additive as a special performance mechanism onto the surface of the fastener tape 2.

According to the configurations, electromagnetic wave shield performance be easily secured by applying plating onto the surface of a fastener tape, and moreover, fire-resistant performance can be secured by applying the coating of a fire-resistant additive onto the surface thereof, which provides an effect of making a high quality product at a low cost can be achieved. Therefore, the effects of the present invention are extremely significant.

Brief Description of Drawings

Figure 1 is a front view showing a slide fastener according to an embodiment of the present invention;

Figure 2 is a cross sectional view showing a fastener stringer having a coiled filament fastener element in the slide fastener;

Figure 3 is a cross sectional view showing a similar fastener stringer according to another embodiment;

Figure 4 is a cross sectional view showing a similar fastener stringer as according to still another embodiment;

Figure 5 is a cross sectional view showing a fastener stringer having a single-piece fastener element made of metal in a slide fastener;

Figure 6 is a cross sectional view showing a similar fastener stringer according to further embodiment;

Figure 7 is a front view showing a curved fastener tape;

Figure 8 is a perspective view showing a known electromagnetic wave shield slide fastener;

Best mode for Carrying out the Invention

The embodiments of slide fasteners according to the present invention are

hereunder specifically explained referring to the drawings.

Figure 1 shows a slide fastener according to the present invention.

As the first feature of the slide fastener, a special performance mechanism is provided to the basic functions of the slide faster. More specifically, in order to provide the faster tape 2 of a fastener stringer 1 with electromagnetic wave shield performance, metal plating is applied onto the surface of the fastener tape 2 to form a shield coating 7. In addition, in order to provide the fastener tape 2 further with fire-resistant performance, the surface of the shield coating 7 formed on the surface of the fastener tape 2 is coated with a fire-resistant additive and thus the fire-resistant coating 7 is formed.

The second feature of the slide fastener is as follows. Before attaching fastener elements 3 to the fastener tape 2 of a fastener stringer 1, the fastener tape 2 is sewn with a sewing thread 6 so that the entire part of a first edge part 12 of the tape 2 is curved inward, as shown in Fig. 7, regardless of whether a core material 8 is provided at the edge part 12 of the tape 2 or not. Thus, the surface of the fastener tape 2 does not cause sewing wrinkles when the fastener stringer 1 is attached to a joining material. Here, in the figure, the reference numerals 20, 21 and 22 show a slider, an opener and a stopper, respectively.

As shown in Fig. 2, the fastener tape 2 of a fastener stringer 1 is formed by a single strip of tape. The fastener tape 2 is fabricated by: producing a base material of the fastener tape 2 having a plain weave structure using a polyester-base fiber or a polyamide-base fiber as a warp and a weft; then applying hot-dip plating to both of the front and back surfaces of the base material of the fastener tape 2, (for example, plating is given on both surfaces of the fastener tape 2 by immersing the tape in melted solution of copper and nickel); and thus forming a shield coating 7.

The reason why a plain weave structure is employed for the fastener tape 2 used herein is that the plating solution and the fire-resistant additive are likely to infiltrate uniformly into the whole body of the tape 2 with its uniform structure over the whole body, and the tape 2 can be made at a low cost. However, as a tape with uniform structure over the whole body, not only a plain weave structure but also other structures may be

employed. For example, a warp-knitted tape or a nonwoven fabric formed by interlacing fibers may also be employed. In any case, it is preferable that plating or fire-resistant additive coating is applied to the surface of a fastener tape 2 in the state of a straight shape.

If the tape is curved, it is difficult to immerse many tapes in a plating bath while arranging them in an orderly manner and it is extremely difficult to process them while continuously transferring them to coating equipment. Therefore, the fastener tape 2 is preferably treated in the state of a straight shape.

After forming a shield coating 7 on both surfaces of a fastener tape 2, the fastener tape 2 is sewn with the sewing thread 6 continuously extending in the longitudinal direction of the fastener tape 2 in the vicinity of the first edge part 12, namely in the vicinity of the installation part 5 to which a fastener element 3 is attached. Accordingly, the fastener tape 2 is tightened in the longitudinal direction thereof and formed into such a shape that the edge part 12 of the fastener tape 2 is curved inward relative to the longitudinal direction. As a type of sewing with the sewing thread 6, the lock stitch type is preferable. The lock stitch is simple and makes it possible to save a sewing thread and to produce the fastener tape 2 at a low cost.

In a case of the fastener tape 2 fixed in a curved shape, as shown in Fig. 2, at the first edge part 12 of the fastener tape 2, a leg 15 of a coiled filament fastener element 14 into which a core string 10 is inserted is attached to the fastener tape 2 with an attachment thread 18 of double-ring stitch. Consequently, the lock-stitch sewing thread 6 is disposed in the vicinity of a connecting part 17 of the coiled filament fastener element 14. The attachment of the fastener element 3 to the curved fastener tape 2 causes no problem because the fastener element 3 is attached while the curved fastener tape 2 is held in the state of a straight shape. Consequently, there is the advantage that, when the finished curved fastener stringer 1 is sewn on a joining material, even though a second edge part of the fastener tape 2 is tightened in the longitudinal direction thereof by machine sewing, the phenomenon of the wavy surface of the fastener tape 2, namely sewing wrinkles, can be avoided.

In the present embodiment, in order to provide fire-resistant performance to the fastener tape 2 further after the shield coating 7 is formed on the surface of the fastener tape 2 by plating, a fire-resistant additive such as an inorganic salt, a halogen compound, or a phosphoric acid ester is applied by coating onto the surface of the shield coating 7 on the fastener tape 2 and thus the fire-resistant performance is also provided. As a consequence, a fastener stringer 1 having both the electromagnetic wave shield performance and the fire-resistant performance at the same time is made.

The fire-resistant performance is not necessarily provided, or the coating 7 of a fire-resistant additive may be formed instead of plating. The filament fastener element 14 attached to a fastener tape 2 is not limited to a coil shape, and a zigzag filament fastener element 14 may be used. Here, the reference numeral 16 in the figure shows a fitting head.

According to the present embodiment, the following advantages can be obtained.

By attaching the fastener element 3 to the first edge part of the fastener tape 2 and sewing the fastener tape 2 in the vicinity of the installation part of the fastener element 3 with a sewing thread 6, the edge part can be curved inward.

By plating the surface of the fastener tape 2 to form a plating film and further coating the surface thereof with the fire-resistant additive to form a coating 7, the electromagnetic wave shield performance by plating and the fire-resistant performance by fire-resistant additive coating are easily secured, which has an effect of making a high quality product at a low cost.

Herein, since the fastener tape 2 is made of fiber and allows the plating solution and the fire-resistant additive to infiltrate uniformly into the whole body of the tape, the treatment of electromagnetic wave shielding by plating and the treatment of coating of a fire-resistant additive can be applied to the fastener tape 2 extremely easily, which has an effect of making a high quality product at a low cost.

As explained above, the present embodiment provides the effects of: being able to easily produce the slide fastener having both electromagnetic wave shield performance

and fire-resistant performance by a coating 7 at a reduced production cost; and moreover being able to provide, at low cost, the high quality slide fastener that can avoid the phenomenon of a wavy tape, namely sewing wrinkles, because of the curved fastener tape 2, even when the fastener stringer 1 is attached to a joining material.

Like the aforementioned embodiments shown in Figs. 1 and 2, the fastener stringer 1 shown in Fig. 3 is produced by forming a shield coating 7 on both surfaces of the fastener tape 2. It is different from the embodiment of Figs. 1 and 2 in the following points.

In the present embodiment, an edge part 12 of the fastener tape 2 is folded inward to make a folded part 4, and an end part 19 of the fastener tape 2 itself is sewn on the fastener tape 2 with a lock stitch sewing thread 6. Then, the sewing thread 6 is stretched to curve the fastener tape 2, and at the same time the edge part 12 is reinforced. After that, a core string 10 is inserted into a coiled filament fastener element 14 and the fastener element 14 is attached onto the surface of the folded part 4 of the curved fastener tape 2 with the attachment thread 18 of double-ring stitch. Thus the fastener stringer 1 is completed.

According to the present embodiment, the following advantages can be obtained in addition to the advantages of the embodiments shown in Figs. 1 and 2.

By folding inward the first edge part of the fastener tape 2 to form the folded part 4 and attaching the fastener element 3 to the folded part 4, the edge part of the fastener tape 2 is reinforced and the fastener element 3 can be attached in a stable state.

Like the aforementioned embodiment shown in Fig. 3, the fastener stringer 1 shown in Fig. 4 is produced by forming the folded part 4 on a fastener tape 2 of the fastener stringer 1 and forming a shield coating 7 on both surfaces of the fastener tape 2. It is different from the embodiment of Fig. 3 in the following points.

In the present embodiment, the fastener tape 2 is folded to form an overlaid part, a core material 8 formed from a sheet of flat reinforcement 9 is inserted into the overlaid

part of the folded fastener tape 2, and thus the folded part 4 of the fastener tape 2 is reinforced.

Here, the reinforcement 9 continuously extends in the longitudinal direction of the fastener tape 2 and is a narrow tape made by weaving fabric or knitting with fabrics such as polyester fiber, polyamide fiber or the like.

The fastener tape 2 is sewn at an end part 19 thereof with a lock stitch sewing thread 6 and formed so that the whole body of the fastener tape 2 is curved, and thereafter, a coiled filament fastener element 14 into which a core string 10 is inserted is attached onto the surface of the folded part 4 with an attachment thread 18 of double-ring stitch.

According to the present embodiment, the following advantages can be obtained in addition to the advantages of the embodiment shown in Fig. 3.

By inserting the core material 8 into the folded part of the fastener tape 2 and attaching a fastener element 3 thereto with the core material 9 *(Translator's comment: the core material 8)* being interposed, the edge part of the fastener tape 2 is reinforced and the fastener element 3 can firmly be attached in a stable state.

Like the aforementioned embodiment shown in Fig. 3, the fastener stringer 1 shown in Fig. 5 is produced by folding a fastener tape 2 having electromagnetic wave shield performance by forming a shield coating 7 or further having a fire-resistant additive coating 7 on both surfaces of the fastener tape 2 to form a folded part 4. It is different from the embodiment of Fig. 3 in the following points.

In the present embodiment, a core material 8 made of a round core string 10 produced, for example, by bunching synthetic fiber such as polyester fiber or polyamide fiber is inserted into a folded part 4 to form a bulgy edge part 12. The vicinity of the edge part 12 is sewn with a lock stitch sewing thread 6 to form an installation part 5. ,Then, a metal fastener element 13 including a fitting head 16 and a pair of legs 15 projecting from the fitting head 16 is attached to the installation part 5 and the fastener tape 2 is formed so that the whole body thereof is curved inward as shown in Fig. 7.

With regard to the curved fastener tape 2, the legs 15 of the metal fastener

element 13 are fixed to the bulgy edge part 12 formed by the core material 8 in a manner of clamping the bulgy part 12 in between. In this case, they are configured so that the sewing thread 6 is located in the vicinity of the installation part 5 of the metal fastener element 13 attached to the fastener tape 2. Here, the fastener element 13 is not limited to a metallic one but it may be formed by injection molding of a synthetic resin onto the tape edge part 12 in a manner of clamping the folded part 4. The reference numeral 16 in the figure shows a fitting head.

According to the present embodiment, same advantages with those in the embodiment shown in Fig. 4 can be obtained.

In the fastener stringer 1 shown in Fig. 6, at the aforementioned folded part 4 of the fastener tape 2 of the fastener stringer 1 shown in Fig. 5, the fastener tape 2 having a shield coating 7 on both surfaces of the tape is folded and a core material 8 is inserted into the overlaid part of the fastener tape 2. The core material 8 is formed by folding a single sheet of support piece 11 woven or knitted like the aforementioned reinforcement 9 and inserting a core string 10 such as a round string into the folded part. The fastener tape 2 is reinforced by inserting the core material 8 into the folded part 4 and peripheral area of the fastener tape 2 and the bulgy edge part 12 is formed at a first edge part of the fastener tape 2. After that, an edge 19A of the support piece 11 inserted into the folded part 4, together with the overlaid fastener tape 2, is sewn with a sewing thread 6 to form an installation part 5 to which a fastener element 13 can be attached. The fastener tape 2 is formed so that the whole body thereof is curved inward as shown in Fig. 7.

That is, the fastener stringer 1 is formed by: fixing the legs 15 of a metallic fastener element 13 to the bulgy edge part 12 of the curved fastener tape 2 in a manner of clamping the bulgy edge part 12 in between so that the sewing thread 6 provided to the fastener tape 2 is located in the vicinity of the legs 15 of the fastener element 13.

According to the present embodiment, the following advantages can be obtained in addition to the advantages of the embodiment shown in Fig. 3.

By inserting the core material 8 having the core string 10 at the edge of the

support piece 11 into the folded part 4 and the peripheral area of the fastener tape 2 and attaching the fastener element 3 with the core material 8 being interposed, the edge part of the fastener tape 2 is reinforced and the fastener element 3, particularly the single piece of metallic or resin-formed fastener element 3, can be firmly attached in a stable state.

Industrial Availability

The present invention can be used as a slide fastener attached to opening-and-closing portions of various goods including containers, such as bags, and clothes, particularly, as a slide fastener having electromagnetic wave shield performance capable of shielding interfering electromagnetic waves and/or fire-resistant performance of low flammability.